What is claimed is:

1. A microelectrical mechanical actuator, comprising:

(a) a substantially planar substrate having a first conductor coupled to a source at a first electrical potential and a second conductor coupled to a source at a second electrical potential wherein the second electrical potential is less than the first electrical potential;

(b) a first conductive coil having a first end fixedly coupled to the substrate and wherein the first end is in communication with the first conductor and the second end is in communication with the second conductor so that electrical current can be selectively conducted through the first coil so as to create a first magnetic flux within the coil; and

(c) a magnet located proximate the first coil and providing a second magnetic flux;

(d) wherein the first magnetic flux is substantially opposed to the second magnetic flux thereby causing a repulsive magnetic force that moves the second end of the first coil relative to the substrate.

2. The microelectrical mechanical actuator of claim 1 wherein the first magnetic flux is substantially orthogonal to the substrate.

3. The microelectrical mechanical actuator of claim 1 wherein the first coil is substantially a conical helix when the second end of the coil is moved.

4. The microelectrical mechanical actuator of claim 1 wherein the first coil is two interleaved conical spirals.

5. The microelectrical mechanical actuator of claim 1 further comprising a second conductive coil having a first end fixedly coupled to the substrate and where the first end is in communication with the second conductor and a second end that is in communication with the second end of the first conductor, whereby

the selective electrical current in the first coil is conducted through the second coil so as to create a third magnetic flux and the first and third magnetic flux are substantially opposed by the second magnetic flux thereby causing the second ends of the first and second coils to move relative to the substrate.

6. The microelectrical mechanical actuator of claim 5 further comprising a bridge fixedly coupled to the second ends of the first and second coils.

7. The microelectrical mechanical actuator of claim 5 wherein the first coil is a clockwise conical spiral and the second coil is a counterclockwise conical spiral.

8. The microelectrical mechanical actuator of claim 5 wherein the first and second coils are interleaved double conical spirals.

9. The microelectrical mechanical actuator of claim 5 further comprising a mirror coupled to the second ends of the first and second coils and wherein the selective electrical current in the first and second coils generates the first and third magnetic fluxes that are substantially opposed by the second magnetic flux so as to move a portion of the mirror relative to the substrate.

10. The microelectrical mechanical actuator of claim1 wherein the first coil is a semiconductor and includes a metal layer for providing a relatively lower resistance path for the selective electrical current.

11. A microelectrical mechanical actuator, comprising:

(a) a planar substrate;

(b) a first coil member having a first end fixedly coupled to the substrate and a second end that is decoupled from the substrate;

(c) a second coil member having a first end fixedly coupled to the substrate and a second end that is decoupled from the substrate and wherein the second ends of the first and second coil members are coupled together; and

(d) magnetic flux means located proximate the first and second coil members that provides a first magnetic flux, and wherein electrical

current is conducted along the first and second coil members and thereby creates a coil magnetic flux in the first and second coils and the first magnetic flux is substantially opposed to the coil magnetic flux thereby causing the second ends of the first and second coil members to move relative to the substrate.

12. The microelectrical mechanical actuator of claim 11 wherein the first and second coils are conical helical coils.

13. The microelectrical mechanical actuator of claim 11 wherein the magnetic flux means is a permanent magnet located on a surface of the substrate opposed to a surface of the substrate on which the first and second coil members are located.

14. The microelectrical mechanical actuator of claim 11 wherein the magnetic flux means is a third coil member conducting current.

15. The microelectrical mechanical actuator of claim 11 wherein the magnetic flux means is a ferromagnetic material coupled to the substrate.

16. The microelectrical mechanical actuator of claim 11 further comprising a bridge that couples the second ends of the firs and second coil members.

17. A mirror actuator device, comprising:

(a) a first and a second actuator;

(b) a mirror coupled to the first and second actuators; and

(c) a magnetic flux source that provides a first magnetic flux;

(d) wherein the first and second actuators each include first and second members having first ends that are fixedly arranged and second ends that are electrically coupled so that current can flow between the first and second members of each actuator, whereby current can be selectively applied to the first or second actuator to create a second magnetic flux that causes the respective actuator

member to expand to move the mirror from a first orientation to a second orientation.

18. The actuator device of claim 17 further comprising a third and fourth actuator coupled the mirror and wherein the third and fourth actuators include first and second members having first ends that are fixedly arranged and second ends that are electrically coupled so that current can flow between the first and second members of the respective actuators, whereby current can be selectively applied to the first, second, third, or fourth actuator to create the second magnetic flux that causes the respective actuator member to expand and move the mirror from the first orientation to the second orientation.

19. The actuator device of claim 17 wherein the first and second actuators and the mirror are formed on a planar substrate and the mirror is substantially planar and substantially parallel to the substrate.

20. The actuator device of claim 18 wherein the first and second actuators can cause the mirror to rotate about a first axis of rotation and the third and fourth actuators can cause the mirror to rotate about a second axis of rotation.

21. The actuator device of claim 17 wherein the first members of the first and second actuators include a conductor portion and a semiconductor portion.

22. The actuator device of claim 17 wherein the first and second actuator members are conical spirals in shape and flexible so the second ends can move relative to the first ends that are fixedly arranged.

23. The actuator device of claim 17 wherein the first and second actuators are formed by lithographic fabrication on a planar substrate and the mirror is suspended above the substrate by the first and second actuators and actuation of the first or second actuator moves the respective first or second mirror margin away from the plane of the substrate.

24. A microelectrical mechanical system actuator for moving a mirror, comprising:

(a) a planar substrate;

(b) a plurality of actuators, each actuator including an electrically conductive coil that generates a magnetic flux when current is conducted by the coil and wherein the actuators are arranged to support a mirror above the substrate;

(c) a magnetic flux source that provides a first magnetic flux;

(d) a first current source that provides a steady-state current for generating a steady-state magnetic flux in the actuators so as to raise the mirror a par distance above the substrate; and

(e) a second current source that provides a selective second current for generating a second magnetic flux in the actuators so as to move the mirror relative to the substrate a greater or lesser distance than the par distance.

25. The microelectrical mechanical system actuator of claim 24 wherein each actuator includes first and second electrically conductive coils wherein the first coil is a clockwise spiral and the second coil is a counterclockwise spiral.

26. The microelectrical mechanical system actuator of claim 24 wherein each actuator includes first and second electrically conductive coils and further comprising a bridge that couples the first and second coils to the mirror.

27. The microelectrical mechanical system actuator of claim 24 wherein the magnetic flux source is a permanent magnet.

28. The microelectrical mechanical system actuator of claim 24 wherein the magnetic flux source is a substrate coil conducting electricity.

29. The microelectrical mechanical system actuator of claim 24 wherein the actuator coils comprise a semiconductor portion and a conductor portion.

30. The microelectrical mechanical system actuator of claim 24 wherein each actuator includes first and second electrically conductive coils and a bridge, and first ends of the first and second coils are fixedly coupled to the substrate and second ends of the first and second coils are coupled together by the bridge.

31. A microelectrical mechanical actuator, comprising:

(a) a substantially planar substrate;

(b) a first magnetic-material member having a first end fixedly coupled to the substrate and a second end coupled to a moveable device for moving the device, wherein the magnetic-material coil provides a first magnetic flux; and

(c) an electromagnet located proximate the first magnetic-material member that provides a second magnetic flux when current is conducted in the electromagnet;

(d) wherein the first magnetic flux is substantially opposed to the second magnetic flux thereby causing a repulsive magnetic force that moves the second end of the first coil relative to the substrate thereby moving the moveable device.

32. The microelectrical mechanical actuator of claim 31 wherein the first magnetic flux is substantially orthogonal to the substrate.

33. The microelectrical mechanical actuator of claim 31 wherein the first magnetic-material member is substantially a conical helix when the second end of the is moved.

34. The microelectrical mechanical actuator of claim 31 further comprising a second magnetic-material member having a first end fixedly coupled to the substrate and a second end that coupled to the moveable device, whereby the second magnetic-material member provides a third magnetic flux and the first and third magnetic flux are substantially opposed by the second magnetic flux thereby causing the second ends of the first and second magnetic-material members to move relative to the substrate.

35. The microelectrical mechanical actuator of claim 34 wherein the first and second magnetic-material members are clockwise conical spirals.

36. The microelectrical mechanical actuator of claim 31 wherein the electromagnet is a semiconductor coil formed on the substrate.

37. The microelectrical mechanical actuator of claim 31 wherein the electromagnet is a semiconductor coil and includes a metal layer for providing a relatively lower resistance path for the selective electrical current.

38. The microelectrical mechanical actuator of claim 31 wherein the electromagnet is a semiconductor coil formed on a second substrate and the second substrate is located in proximity to the magnetic-material members.